FIGHT'S ON!

Quarterly Newsletter from the Warfighter Training Research Division (AFRL/HEA) of the Air Force Research Laboratory Human Effectiveness Directorate

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Team Mesa to Integrate Joint Close Air Support Training Efforts

Mesa Research Site (MRS) AZ hosted the Joint Close Air Support (JCAS) Symposium expanding recent discussions of unique and persistent challenges involved in Close Air Support (CAS) in an attempt to identify common goals that will lead to more effective training across all Services. Recent coalition operations heightened emphasis on operating as a homogenous fighting team and focused attention on Terminal Attack Controller (TAC) training improvements. A great deal of synergy can be achieved if JCAS training needs are coordinated through a central agency adept in warfighter training technologies and methods. Noting the Division's successes in Distributed Mission Training (DMT) and Distributed Mission Operations (DMO) research, AFRL/HEA agreed to be the vanguard and focal point for coordinated JCAS training initiatives, leveraging new programs supporting Air Force Special Operations Command (AFSOC) in developing Special Tactics and Battlefield Air Operations (BAO) kit mission training capabilities.

USAF A-10 and USMC AV-8 pilots currently conducting sensor-to-shooter Close Air Support missions in Afghanistan will benefit from JCAS training systems

Terminal Attack Controller communicates with TACP Warriors to conduct CAS missions

Mission area experts from the USAF Air Ground Operations School, the USMC Marine Air Warfare Training School, the USN Special Operations Command, and the USA Special Operations Command expressed the need to increase the numbers of Forward Air Control (FAC) and TAC qualified personnel within all Services. Upgrading the current BAO/TAC kit is a SECDEF emphasis item, and AFRL/HEA members are on the Integrated Product Team (IPT) working to increase capability and efficiency of the equipment while slashing weight, reducing complexity of operation, and vastly improving digital information processing, along with developing a new generation of mission training and rehearsal capabilities. While the Services have differing approaches to FAC/TAC operations, mission qualification training and mission rehearsal can be tailored to meet individual, team, and team-of-team readiness training needs through realistic scenarios enabled by enhanced training opportunities in the DMT/DMO environment.

The JCAS Joint Test Force (JTF) was formed to help standardize procedures and training for all US CAS operations, highlighted by recent Afghanistan actions bearing out the intricacies of the CAS mission. This focus opened the way for the JCAS JTF to explore and embrace the capabilities inherent in the expanding DMT/DMO environment and the ability to address a myriad of complex Mission Essential Competencies (MEC) required for all warfighters working the CAS mission kill chain. Mission areas such as "time critical targeting" or "time sensitive targeting" are easy to understand, yet difficult to execute, particularly since complexities inherent in these dynamic combat arenas require warfighters from all fields of expertise to perform at peak efficiency with near-perfect situation awareness. Stemming from an earlier JCAS JTF meeting at Eglin AFB FL, the Mesa

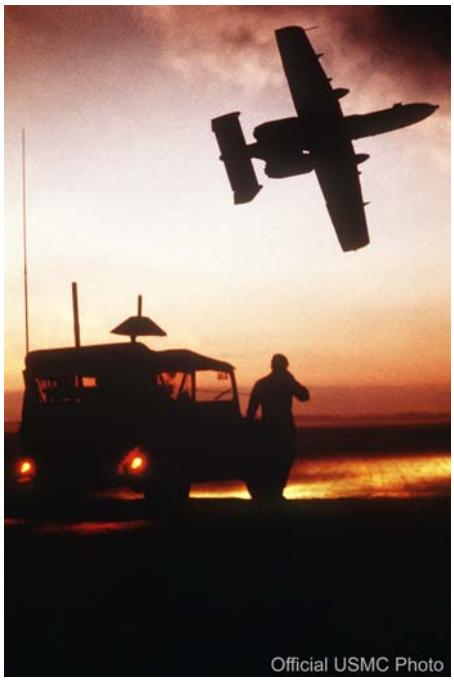
symposium provided a forum to meet with key JCAS training commanders and decision-makers from all Services. JCAS experts emphasized the requirement for more training opportunities along the entire spectrum of JCAS, from Command and Control (C2) functions, to Tactical Air Control Party (TACP) training, and addressed DMT requirements and funding for simulation training systems in light of USAF DMT/DMO roadmaps.

DMT/DMO capabilities promise extremely cost effective and resource efficient methods for expanding both the volume and scope of JCAS training. The most important requirement is the need for a significant increase in training opportunities, despite a critical shortage of resources, including sorties, ranges, and munitions. To ensure warfighter training opportunities cover the entire spectrum of JCAS operations, the JTF determined any JCAS training must include the vital C2 link between sensors and shooters.

While the Services are determining what training is required to be a "Joint Qualified FAC," they will also determine what training can or should be accomplished via DMT/DMO. Training applications flow from the most obvious simulation of the TACP environment and "visual" operations with linked aircraft, to the Services' need to use DMT/DMO to train complex C2 functions required during JCAS operations. For example, the recent phase-out of the venerable Airborne Battlefield Command and Control Center (ABCCC) aircraft transferred many of the ABCCC functions to warfighters serving on aircraft such as the Joint Surveillance Target Attack Radar System (JSTARS) and Airborne Warning and Control System (AWACS), and Combined Air Operations Center (CAOC) ground-based C2 facilities, significantly increasing weapons controller mission complexity.

There is currently, however, minimal formal training capacity to ensure seamless mission support in dynamic hostile operational environments. Integrating training systems representing JSTARS, AWACS, and CAOC entities with sensor-to-shooter simulations inherent in DMT/DMO systems promises the best alternative to live-fly/live-operations C2 training for JCAS missions. This training approach can also incorporate other critical C2 nodes, such as Joint warfighters working in Air Support Operations Centers (ASOC), Fire Support Elements (FSE), and TACPs.

With DMT/DMO integration, FSE teams and Battalion/Maneuver Force Commanders can prepare for live exercises at the National Training Center (NTC) in California. An initial proposal to simulate the FSE's radios, with links to key C2 nodes providing a satisfactory "picture" of the battlespace, can provide the training required to use JCAS assets more efficiently in realistic training scenarios or actual combat. The



An A-10 passes over USAF Air Liaison Officer during CAS training mission– – this scene could soon be played out in the DMT/DMO environment

Joint Special Operations community also has a need for realistic TACP training, as US Army and US Navy warfighters need enough FAC/TAC qualified personnel to support Special Forces teams. DMT/DMO integration would significantly improve their indigenous ability to field FAC-trained personnel.

FAC training, including FAC-Air and Ground-FAC (GFAC) warfighters, will benefit from DMT/DMO to enhance training, with an eye towards supplementing available real-world BAO/TAC kit training requirements with advanced combat mission skills learned in simulation. Locating DMT/DMO nodes with organizations supported by live-fly training sorties could enhance FAC/JCAS training tools. For instance, a GFAC trainer located at Nellis AFB NV could supplement the USAF GFAC training schoolhouse (6th Combat Training Squadron) and allow for both rapid evolution/validation of the system and integration into the formal training syllabus. Similarly, locating training systems at Tinker AFB OK and the NTC would provide enhanced C2 training opportunities for users in standalone or DMT/DMO exercises.

AFRL/HEA training research experts are assessing AFSOC's Special Tactics Air Ground Interface Simulator (STAGIS) for DMT/DMO integration. STAGIS will meet Combat Control Team mission training requirements for air traffic control tower operations, air traffic control in fluid tactical assault zone operations, and CAS operations. STAGIS will enable operators to conduct mission rehearsal training using systems emulating BAO/TAC kits in tailored dynamic scenarios mirroring operational mission tasking. Networking to aircraft, vehicle, and ground force systems for DMT/DMO mission rehearsal or Joint exercises will enable warfighters and commanders to simulate and evaluate multiple mission options prior to live operations.

This capability will integrate STAGIS with DMT/DMO networks using High Level Architecture (HLA) protocols and Joint Technical Architecture methodologies. Through networking, STAGIS will be a member of the HLA federated system of simulators enabling operators to participate in worldwide Joint and coalition training exercises. AFRL/HEA is currently helping AFSOC determine the feasibility of modifying STAGIS to include Night Vision Training System (NVTS) capabilities developed for DMT-Air training research at MRS. Since the Combat Controller mission is very similar to TACP or GFAC mission requirements, AFRL/HEA can build upon proven technologies and methods to synergize similar training objectives as the Executive Agent for these efforts.

Next Generation Threat System

During a meeting at HQ ACC, Langley AFB VA, the Division's principal scientist and engineer presented an update on the development of the revolutionary Next Generation Threat System (NGTS), one of the Division's Advanced Technology Demonstration (ATD) efforts. The NGTS has been tested on-board an MC-130P (12 sorties in an ongoing test and evaluation phase) and passed flight-safety checkout sorties prior to flying on board electronic warfare tactical training missions, ranging from low to high threat scenarios. The NGTS stimulated aircraft sensor arrays to indicate threats from anti-aircraft artillery, surface-to-air missile, and fighter aircraft. This system can also be directly ported to networked flight simulations, providing realistic Integrated Air Defense systems, C2 elements, and real-time effects based upon warfighter reactions to those threats.

Facilitating discussions with representatives from ACC's training requirements office, the Aeronautical Systems Center's training systems acquisitions office, and the Air Logistics Center training systems sustainment office, the AFRL/HEA leads helped refine key NGTS performance parameters and identify candidate simulation systems for the final program efforts. The IPT developed additional specific criteria and measures for assessing NGTS performance, and agreed the Theater Aerospace Command and Control Simulation Facility (TACCSF) at Kirtland AFB NM is a suitable ATD assessment environment.

Capt Chris Biegun, Program Manager, explains the functionality and training advantages of the Space Operations Simulator to Brig Gen Steve Sargeant, AETC/XP, and Col Tom Quelly, AETC/ADO, as part of their DMT research orientation tour at MRS

Desert Pivot Tests DMT/DMO

With TACCSF orchestrating quarterly "Desert Pivot" exercises encompassing numerous USAF and sister-Service DMT/DMO nodes, AFRL/HEA ensures scenarios emphasize mission training needs for warfighters flying in Mesa's DMT Testbed during these long-haul events. Participating warfighters for Desert Pivot 03-1 included F-16 pilots and an intelligence technician from Cannon AFB NM, and a team of pilots from the New Mexico Air National Guard. Division scientists, engineers, and subject-matter experts conduct ongoing analysis of DMT/DMO exercises to help drive complex technology developments enabling the "system-of-systems" to fully support realistic mission readiness training needs for individuals, teams, and teams-of-teams. To that end, aircrew and engineers at Mesa implemented an innovative combination of on-site computer generated forces supporting individual aircrew training objectives as well as more numerous DMO forces being used to train AOC and Air Force package operators. This approach will help ensure DMT/DMO excercises minimize the use of some warfighting operators acting only as training aids for others, thus maximizing training value for all participants.

The NGTS test team, led by AFRL/HEA Threat Engineer Glenn Cicero (center), following successful tactical missions in MC-130P "Combat Shadow" at Kirtland AFB NM, with on-board NGTS display (inset)

Warfighters from Cannon AFB NM and the New Mexico ANG review mission planning documents with AFRL/HEA subject-matter experts prior to flying Desert Pivot 03-1 simulator missions in Mesa's DMT Testbed

TARGETS OF OPPORTUNITY

As a result of the AETC/CC visit to Mesa in Fall 2002, followed by visits from AETC/XP, 19th AF/CC, and 56th FW/CC, Air Education and Training Command (AETC) is exploring options to establish **Night Vision Goggle (NVG) familiarization** academics in Specialized Undergraduate Pilot Training and follow-on graduate training programs. Leadership from AETC's Introduction to Fighter Fundamentals program at Moody AFB GA, discussed options with members of AFRL/HEA's "Fly by Night" training research team to imbed an NVG training capability in AT-38 aircraft simulators.

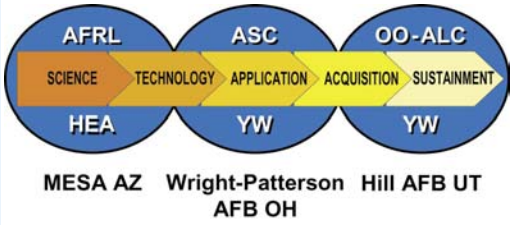
Gaining advocacy for the Division's **AOC training research** plan among Air Combat Command's (ACC) C2 staff (ACC/DOY) and the training shop of Air Force Command and Control Intelligence, Surveillance, and Reconnaissance Center (AFC2ISRC/DOT), researchers and program managers will gain access to subject-matter experts for MEC development applicable to AOCs. During briefings to the commanders of the Aeronautical Systems Center and AFRL, the generals lauded the Division's program manager for the "truly groundbreaking" MEC development effort's competency-based approach to complex training requirements for AOC warfighters.

With endorsement of the JCAS community, the Division plans to lead development for an **AFSOC Special Tactics Trainer** (STT). The start for this effort stems from needs expressed by the 720th Special Tactics Group at Hurlburt Field FL, where there is currently no reliable method to simulate and train the end-game tactical air and weapons control MECs critical for their TAC mission. By pulling together all stakeholders in the BAO/TAC operations community to help with the AFSOC STT research effort, AFRL/HEA can facilitate the integration effort as multi-Service TAC experts develop a Joint Operational Requirements Document.

Dr. Liz Martin, Night Vision Program Manager, describes NVTS technologies and training applications to Lt Gen Richard Reynolds, ASC/CC, and Col Mike Chapin, ASC/YW, Director, TSPG

BRIEFS AND DEBRIEFS

After more than 12 years of developing and conducting the **NVG Instructor Course**, certifying more than 2,000 warfighters and mission support personnel from DoD and international services while gaining valuable training research data, the AFRL/HEA "Fly by Night" research team is planning transition of the NVG Instructor Course to AETC in Fiscal Year 04.



As the research and development arm of the **Training Systems Product Group** (TSPG) triad, AFRL/HEA was invited for the fourth year to conduct a series of comprehensive demonstrations of technologies at the 2002 Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC). In-house science and technology showcased in the TSPG booth for I/ITSEC 2002 included the handheld Mobile Operational Measurement System gradesheet data collection tool for tactical training evaluation, the DMT online Performance Evaluation and Tracking System, and a new distributed multimedia tactical Air Superiority Knowledge Assessment System. Several Small Business Innovative Research (SBIR) technologies featured an Aptima, Inc. structured performance measurement system called SPOTLITE, Sonalysts, Inc. adaptive training system for satellite operations (co-sponsored effort between AFRL/HEA and the Space and Missile Systems Center), and a portable, voice recognition- and computer-generated force enhanced training system under development by Aptima, Inc. for AWACS controllers (a collaborative effort between AFRL/HEA and AFRL/HES). Finally, AFRL/HEA demonstrated virtual reality-based environment authoring tools being developed for maintenance training in collaboration with the Maricopa Institute for Virtual Reality Technologies, Chandler-Gilbert Community College.

Micro Analysis and Design (MA&D) hosted a Phase II SBIR workshop with AFRL/HEA fighter experts at their Boulder CO offices. This ongoing cooperative effort to **map and weight performance measurements** onto MEC knowledge and skill items hinges on operationally defining performance measures and standards, primarily through analysis of mission briefings, standards outlined in AF Tactics, Techniques, and Procedures series publications, and objective performance data extracted during complex DMT scenarios.

Maj Gen Paul Nielsen, AFRL/CC, recently visited MRS to present Dr. Dee Andrews with the official promotion letter to Senior Scientist status (equivalent to Senior Executive Service)

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